

'GOT MILK?' NOT AN IDLE QUERY Breast Milk Is 'Liquid Gold' for Infants, Hinde Says

BY ERIC BOCK

Mother's milk does so much more than just feed a baby. Along with fats, proteins, vitamins and minerals, it also supplies hormones, stem cells and immune factors that help protect babies from disease-causing organisms, explained Dr. Katie Hinde at a Wednesday Afternoon Lecture recently in Masur Auditorium.

"Because of these myriad functions, breast milk is considered liquid gold and breastfeeding is a gold standard that's advanced by many national and international bodies that guide public health and



Dr. Katie Hinde speaks at NIH.

medical decision-making," said Hinde, an associate professor at Arizona State University's School of Human Evaluation and Social Change.

Mother's milk may prevent, treat or cure many of the world's infant health problems such as obesity and diarrhea, the leading cause of child mortality, she said.

Most of what's known about breast milk comes from research on dairy cattle, mammary gland dysfunction, the development of breast milk substitutes like formulas and from evolutionary biology. Until recently, there has been relatively little research on what's actually in breast milk.

In her lab, Hinde studies the milk rhesus monkey mothers make for their babies. "The 'biological recipe' of milk for sons and daughters can differ," she observed. Mothers who gave birth to a daughter produced more milk than mothers who gave birth to a son—a

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Circus comes to NIH and vice versa. See p. 12.

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IN TOUCH

'Wearables' Shed Light on Brain, Behavior

BY DANA TALESNIK

From cell phones to wristwatches, technology is getting smarter and smaller. For one engineer, a project that began with a cumbersome wearable computer evolved into small sensors in glasses and hats that could interpret facial expressions. These innovations paved the way for even smaller sensors embedded in wristbands that measure emotional peaks. It's life-changing technology for patients with autism, epilepsy and depression



Dr. Rosalind Picard

SEE **WEARABLES**, PAGE 4

Understanding Basis of Touch Offers Insights, Ginty Says

BY ERIC BOCK

"The sense of touch is fundamental to our daily lives," explained Dr. David Ginty at the NCCIH Integrative Medicine Research Lecture Series in Lipsett Amphitheater on Mar. 7.

It allows people to recognize objects in their hands, determine what something is based on how it feels, instructs them how to react to situations and allows them to emotionally bond with each other, said Ginty, the Edward R. and Anne G. Lefler professor of neurobiology at



Dr. David Ginty

SEE **GINTY**, PAGE 6

Hopkins' Krimigis To Speak on Human Spaceflight, May 10

Dr. Stamatios "Tom" Krimigis of the Johns Hopkins Applied Physics Laboratory will teach a Demystifying Medicine course on Tuesday, May 10 from 4 to 5:30 p.m. in the first-floor conference room in Bldg. 50. The title of his lesson is "Robotic Planetary Exploration and Thoughts about Human Spaceflight."



A physicist and space scientist, Krimigis was the principal investigator on several NASA spacecraft, including

Voyagers 1 and 2, and has participated in NASA missions to every planet in the solar system.

The Demystifying Medicine course, jointly sponsored by FAES and NIH, is designed to help bridge the gap between advances in biology and their application to major human diseases. All are welcome to attend this talk, at which Krimigis will discuss the challenges of prolonged human spaceflight and the role of biomedical scientists in space exploration. The course will be videocast live and then archived at <http://videocast.nih.gov>.

Women's Health Week Recognizes Pinn at May 10 Event

The 17th annual National Women's Health Week will be held May 8-14. As part of the week's activities, the NIH Office of Research on Women's Health will host the inaugural Vivian W. Pinn Seminar. It will honor Dr. Vivian Pinn, the first and former director of ORWH, and will feature a keynote address from Dr. Lauren Wood, senior clinical investigator at the National Cancer Institute. It takes place Tuesday, May 10 from 2 to 3:30 p.m. in Bldg. 60's main hall.

The event is free and open to the public. Registration is not required. For more information about the seminar, visit www.nih.gov/women.

Career Symposium Scheduled, May 6

The NIH Office of Intramural Training & Education invites all NIH graduate students and postdoctoral trainees, both basic scientists and clinicians, to its 9th NIH Career Symposium on Friday, May 6 at the Natcher Conference Center from 8:30 a.m. to 5 p.m. Program will include breakout sessions highlighting career opportunities for biomedical scientists. Panel sessions cover academic, government, industry and non-profit career paths. More than 80 speakers will provide career insights. Get details at www.training.nih.gov.



The Bldg. 1 pit stop is the campus gathering point for each BTWD. This was the scene in 2015.

Bike to Work Day, May 20

Join the NIH Bicycle Commuter Club and Office of Research Services, Division of Amenities and Transportation Services for Bike to Work Day on Friday, May 20. It is a celebration of bicycling as an environmentally friendly, fun and healthy way to get to work.

Registration is free and you can sign up for one of the NIH-affiliated pit stops. Events will be held at Bldg. 1 from 7 to 9:30 a.m.; Rock Springs Business Park (Marriott HQ) from 6:30 to 8:30 a.m.; and Rockville-Fallsgrove (near NCI Shady Grove) from 6:30 to 9 a.m.

You can also sign up for any of the 83 pit stops in D.C., Maryland and Virginia. Help us defend our proud title as the employer with the most participants by identifying your workplace as the National Institutes of Health.

You must pre-register for the pit stop you plan to visit to receive a 2016 Bike to Work Day T-shirt (available while supplies last). At Bldg. 1, all NIH'ers who show up riding a bicycle and wearing a helmet may enjoy breakfast snacks and a raffle drawing. Register by Monday, May 16 at biketoworkmetrodc.org.

APAO Announces Activities for Asian American Heritage Month

Three events will be presented at NIH in observance of Asian Pacific American Heritage Month, which is celebrated each year in May.

"Diverse Career Pathways of Asian Pacific American Scientific and Administrative Workforce at NIH" is a panel discussion planned for Wednesday, May 4, from noon to 1:30 p.m. in Wilson Hall, Bldg. 1. Robin Kawazoe of the NIH Office of the Director will address administrative career perspectives; Dr. T. Jake Liang of NIDDK will present intramural perspectives; and Dr. Francisco Sy of NIMHD will speak on extramural perspectives. The panel presentations and discussion will be preceded by lunch. A contribution of \$10 is suggested to cover lunch. This event is co-sponsored by the NIH Asian and Pacific American Organization (APAO) and the Office of Equity, Diversity and Inclusion. RSVP to Jimmy Do, Jimmy.Do@nih.gov.

All HHS employees and contractors are invited to attend the "HHS Pre-Conference Agency Forum," hosted by the Federal Asian Pacific American Council (FAPAC) on Monday, May 9, from 8:30 a.m. to 4 p.m. in Masur Auditorium, Bldg. 10. The forum, part of FAPAC's 31st National Leadership Training Program, will address challenges of fostering the recruitment, retention and career development of the Asian American and Pacific Islander workforce at HHS. Attendees are requested to register at <http://fapac.org/hhsforum>; attendees may also view the webcast on event day at <http://videocast.nih.gov/>.

This year's Kuan-Teh Jeang Memorial Lecture on Tuesday, May 17, from 2 to 3 p.m. in Lipsett Amphitheater, Bldg. 10, will be delivered by Dr. Mien-Chie Hung of the University of Texas MD Anderson Cancer Center. The title of his lecture is "Novel Signaling Pathways in Cancer Cells and Development of Targeted Therapy." The event is presented by the NIH Office of Intramural Research and co-sponsored by APAO.

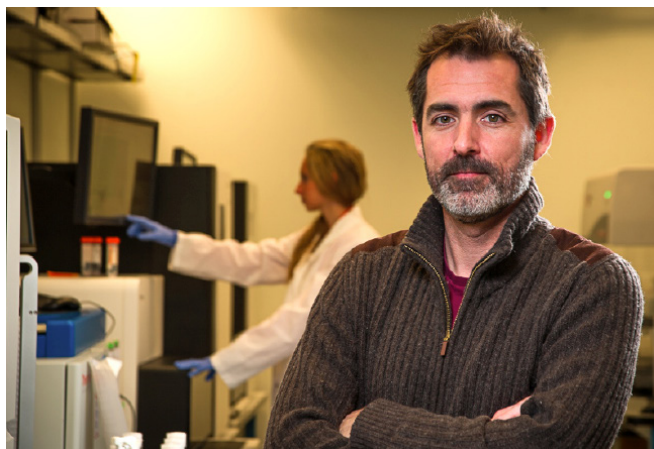
NIA's Singleton To Deliver Mahoney Lecture, May 4

NIA's Dr. Andrew Singleton will discuss "Age, Genes, Sex and Smell: Predicting Parkinson's Disease" on Wednesday, May 4 at 3 p.m. in Masur Auditorium, Bldg. 10. His presentation at the annual Florence Mahoney Lecture on Aging is sponsored by NIA and is part of the NIH Director's Wednesday Afternoon Lecture Series.

Singleton, who heads NIA's Laboratory of Neurogenetics, is an expert in understanding the genetic etiology of Parkinson's disease. His lab was the first to identify synuclein gene dosage mutations as a cause of Parkinson's disease and the Leucine-rich repeat kinase 2 gene as a cause of familial Parkinson's, as well as the more common, sporadic Parkinson's disease. These proteins are now the two leading therapeutic targets for the disease.

Chief of the neurogenetics lab since 2008, Singleton works on the genetic basis of neurological disorders of a number of diseases, including Parkinson's disease, Alzheimer's disease, dystonia, ataxia, dementia and amyotrophic lateral sclerosis. The goal of this research is to identify genetic variability that causes or contributes to disease and to use this knowledge to understand the molecular processes underlying disease.

More recently, Singleton's laboratory has focused on the use of high-dimensional data to understand



Dr. Andrew Singleton

risk and pathogenic function in Parkinson's disease and other neurodegenerative disorders.

His lecture will focus on the most effective route to testing disease-modifying therapies in neurodegenerative disease earlier in the disease process. He will discuss attempts to make headway in identifying at-risk patients earlier, when interventions may be most effective.

Singleton received his B.S. from the University of Sunderland in the United Kingdom and his Ph.D. from the University of Newcastle upon Tyne, U.K. His postdoctoral studies were spent at the Mayo Clinic in Jacksonville, Fla., where his research initially focused on genetic determinants of dementia, in particular Alzheimer's disease and dementia with Lewy bodies.

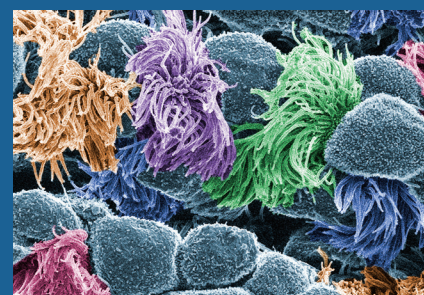
He moved to NIA in 2001 and became a principal investigator, leading the molecular genetics unit

in 2002. Singleton became a tenured senior investigator in 2007 and an NIH Distinguished Investigator in 2016.

He has received numerous awards over the years. These include recognition as the first recipient of the Jay van Andel Award for Outstanding Achievement in Parkinson's Disease Research (2012); the Annemarie Opprecht Award (2008); the NIH Director's Award (2008); and the Boehringer Mannheim Research Award (2005). He currently serves on the scientific advisory boards of the Michael J. Fox Foundation and the Lewy Body Dementia Association.

The annual Mahoney Lecture is named in honor of Florence Stephenson Mahoney (1899–2002), who devoted the last half of her life to advocating successfully for the creation of NIA and increased support for NIH.

There will be a reception and an opportunity to talk with the speaker in the NIH Library immediately after the lecture. **R**



ON THE COVER: Magnified more than 10,000 times, the community of cells lining a mouse trachea

IMAGE: EVA MUTUNGA & KATE KLEIN, UDC & NIST

NLM Cosponsors Conference on Best Practices of Biomedical Research

NLM is teaming with the Friends of the National Library of Medicine and Research!America to host a conference, "Best Practices of Biomedical Research: Improving Reproducibility and Transparency of Preclinical Research." It will take place June 9–10 at the Bethesda Marriott, 5151 Pooks Hill Rd. The session will feature discussion about challenges with non-reproducible research and highlight positive strategies to achieve significant quality improvement in preclinical research studies. It will also generate constructive and practical messages to benefit producers as well as users of biomedical research discoveries.

Speakers will include NCATS director Dr. Christopher Austin, FDA commissioner Dr. Robert Califf, NLM Acting Director Betsy Humphreys, NIGMS director Dr. Jon Lorsch and Stanford's Dr. John Ioannidis.

The complete program, along with information about registration, travel and accommodations, can be found at www.fnlm.org.



FDA commissioner Dr. Robert Califf

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Turning Discovery Into Health

Wearables

CONTINUED FROM PAGE 1

and has the potential to ameliorate the effects of other medical conditions.

“We’re now able to make outwardly observable something that previously was only inwardly happening,” said Dr. Rosalind Picard, founder and director of Affective Computing Research at the Massachusetts Institute of Technology Media Lab and faculty chair of MIT’s Wellbeing Initiative Mind+Hand+Heart. Picard—who spoke to a packed room at a recent NIMH Director’s Innovation Speaker Series lecture in the Neuroscience Center—co-founded two companies, Empatica, Inc. and Affectiva, Inc., which build the affect-sensing and wearable devices.

Picard creates technology that helps computers interpret human emotion, a growing area of research that she named “affective computing.” One of the signals used is electrodermal activity (EDA). Regions deep in the brain activate the sympathetic nervous system, which causes sudomotor innervation, which changes the electrodermal properties of the skin. These changes can be measured noninvasively by a sensor worn on the skin’s surface.

“I’ve got to find things I can measure that are objective, reliable and repeatable,” said Picard. Detecting furrowed brows, extreme stress, excitement and other emotional cues provides data that potentially can be applied to everything from health behavior changes to market research.

What’s more, the latest sensors can track EDA for hours, days, even weeks at a time, providing more than just snapshot data. “We now get all-day data,” said Picard. “You can see what’s normal for a person, if they walk around permanently with a larger EDA response on one side than on the other, or if they only become asymmetric when they have meetings with their boss.”

Interestingly, many patients show very high EDA during sleep, but the peaks usually end just before the person goes into REM sleep. One reason the EDA may be so high is because learning and memory formation occur during sleep, said Picard. Also, the amygdala and hippocampus—regions of the brain associated with emotion—are at work during sleep; stimulating these regions directly has been shown to elicit large EDA.

★ ★ ★
“We now get all-day data. You can see what’s normal for a person, if they walk around permanently with a larger EDA response on one side than on the other, or if they only become asymmetric when they have meetings with their boss.”

—DR. ROSALIND PICARD

★ ★ ★
Picard started out researching whether her sensors could help monitor stress levels in children with autism. Among her innovations are glasses and a handheld device with a circuit that mapped emotions to the brightness of an LED. She hoped the technology could give voice to people who had difficulty communicating.

In one young, autistic child, ankle sensors showed skin conductance peaks when the youngster was roused and during meltdowns. During one therapy session, the child’s EDA peaked while climbing on a swing. Picard said there is ambiguity in such a case: the EDA could peak from emotions as well as from the physical and cognitive (motor planning) effort of climbing onto the swing. However, the EDA decays rapidly once swinging happens; such a decay has also been observed with repetitive motion in autism that can be calming. Since unfamiliar places can cause extreme, needless anxiety in patients with autism, Picard wanted to build something that could measure a person’s physiology anywhere.

“This is the first time we built the sensors so they could leave the lab and measure autonomic activation in a particular

sympathetic nervous system through the skin in a child who—if you brought her into the lab—might have a very different experience than if you measured her in her natural setting,” said Picard.

An unexpected breakthrough occurred when one of Picard’s MIT students borrowed a pair of wristband sensors over winter break to test on his young autistic brother, who couldn’t speak. When reviewing the data, Picard was stunned to see an enormous signal spike, much higher than she’d seen when testing the sensors on stressed students or even Boston drivers. She previously used only one wristband at a time, but the student had fortuitously put the bands on both of his brother’s wrists at the same time.

Curiously, the surge was on only one side of the child’s body; Picard wondered if the other wristband was broken. The signal then stabilized, leading to a clear sleep signature. When she questioned the student, who kept a careful diary, he said the timeframe was 20 minutes before his brother had a grand mal seizure.

Was it possible to have a huge nervous system surge that long before a seizure and



Picard creates technology that helps computers interpret human emotion.

PHOTOS: ERNIE BRANSON

on only one side? Soon, Picard got research approval to enroll patients in round-the-clock EEG, ECG and EDA monitoring. Of 16 grand mal seizures recorded during the study, all had significant skin conductance peaks with the event.

While the EDA peaks did not usually precede the seizures, they did show that it was now possible to achieve more accurate automated seizure detection.


Searching for an explanation as to why the event was measured only on one side, Picard found evidence in the literature that certain regions deep in the brain, particularly those in the temporal lobe, map to only one side of the body's sudomotor nerve response. "There are a lot of brain-imaging studies that suggest the two sides are going to act differently," she said.

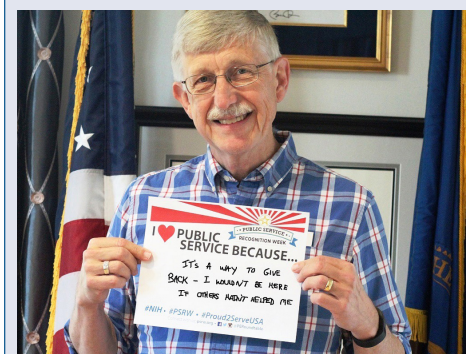
Picard and her MIT colleagues continued their engineering and design work to refine their sensors. Newer versions are becoming more sensitive and accurate. Thanks to the efforts of spin-off company Empatica, they've since shrunk the technology down to a device called Embrace, a water-resistant watch that can run physiology algorithms and measure physical activity, sleep and

temperature. Most importantly, it alerts others that the patient may need help.

"People are much more likely to survive the period of time after a seizure if someone is there," said Picard, referring to a lesser known neurological disease, SUDEP—sudden unexpected death from epilepsy—which may be preventable through an alert system. SUDEP takes more lives in the U.S. every year than house fires or sudden infant death syndrome. After stroke, SUDEP is the second leading neurological cause of years of potential life lost, more than multiple sclerosis, Alzheimer's, Parkinson's, amyotrophic lateral sclerosis and meningitis/encephalitis. Yet most people have never heard of SUDEP.

With continued refinements, Picard intends for her research to help predict and prevent certain neurological conditions, from seizure to depression. It's a long journey of learning to connect our neurological and behavioral wiring and of getting the research out of the lab and into production so more data can be collected and people can benefit.

"We're just at the beginning," said Picard. "It's all going to help make it easier to forecast important health changes." 



NIH director Dr. Francis Collins supports #PSRW and #Proud2ServeUSA.

Public Service Recognition Week, May 1-7

Public Service Recognition Week honors those who serve our nation as federal, state and local government employees. Events are being held May 1-7. Here is how NIH employees can participate:

- Take a photo of yourself with the completed "I Heart Public Service" template at <https://hr.od.nih.gov/about/iheartpublicservice.pdf>. Be sure to take high-resolution photos.
- Upload your photo to Facebook and/or Twitter using the following hashtags: #NIH, #PSRW and #Proud2ServeUSA. The #NIH hashtag allows NIH to find our employees. This can be done during the week of May 1-7.
- Or send your photo to NIHforJobs@od.nih.gov. Images will be posted on NIH social media outlets.

If you have questions or would like more information, contact Anait Freeman at anait.freeman@nih.gov. Visit <http://publicservicerecognitionweek.org/events> for a list of local observances.

Meditation Researcher To Give NCCIH's Straus Lecture

MAY 3

What if we could exercise our minds like we exercise our bodies? What if, by transforming our minds, we could improve not only our own health and well-being, but also those of our communities and the wider world?



On Tuesday, May 3 at 10 a.m., Dr. Richard Davidson of the University of Wisconsin will delve into these kinds of questions as he gives the 2016 Stephen E. Straus Lecture in the Science of Complementary Therapies, "Change Your Brain by Transforming Your Mind." His talk will illuminate the neural and behavioral effects, and the changes in peripheral biology, found with several major types of meditation as well as how those practices could help with regulating emotion and attention.

Davidson is professor of psychology and psychiatry, director of the Waisman Laboratory for Brain Imaging and founder of the Center for Investigating Healthy Minds. The latter has been conducting rigorous and fascinating research on various topics that Davidson suspects affect our

health and well-being, including meditation, emotions, compassion, resilience and attention. You may have seen, for example, news stories about Tibetan monks, who are longtime meditation practitioners, undergoing brain scanning in his laboratory.

The team's meditation studies have included persons who are very young to very old; disorders such as depression, anxiety and autism; and levels of meditation experience from novice to thousands of hours. Research methods include advanced genetic and epigenetic methods, MRI, PET and many others.

The Straus Lecture, to be held in Masur Auditorium and videocast live, is an annual event honoring the founding director of NCCIH. The event is being supported by the Foundation for the National Institutes of Health with additional funding from Bernard and Barbro Osher. A poster session afterward will feature NCCIH grantees conducting research in this area of complementary health. For more information, visit <https://nccih.nih.gov/news/events/lectures>.

Next Protocol Navigation Lecture Set, May 2 in Bldg. 50

The IRP Protocol Navigation Training Program Seminar Series continues with a lecture to be held Monday, May 2 from 2 to 3 p.m. in Bldg. 50, Conf. Rm. 1227/1328. The program is a trans-NIH effort to develop resources and tools and to provide training for intramural staff and contractors involved in protocol development, writing, coordination and management. Valerie Bonham, senior attorney in the NIH branch of the HHS Office of the General Counsel, will present on the NIH Human Data Sharing Policy. For more information, contact Marcia Vital, (301) 451-9437, vitalm@mail.nih.gov.

Ginty

CONTINUED FROM PAGE 1

Harvard Medical School and an investigator at Howard Hughes Medical Institute.

In his lab, Ginty studies how neurons that send processes to the skin of mice can distinguish between different touch sensations and how they send this information to the spinal cord and brain. Findings from his work could one day lead to the treatment of spinal cord injuries.

The first step in the perception of touch, he explained, is activation of a group of neurons called low-threshold mechanore-

• • •

Ginty studies how neurons that send processes to the skin of mice can distinguish between different touch sensations and how they send this information to the spinal cord and brain. Findings could lead to treatment of spinal cord injuries.

• • •

ceptors (LTMRs). These neurons, whose cell bodies are located near the spinal cord, send processes that are distributed throughout skin and terminate just underneath the skin's surface.

Ginty said there are at least five types of LTMRs that respond to skin stimulation: A β SA1, A β RA, A β field, A δ and C. Each has its own structure and function. Depending on the type, LTMRs can optimally detect hair deflection and pulling, skin indentation, stroking and skin stretching. A β RA LTMRs, for example, respond to air puffs acting on the skin and skin stroking while A β field LTMRs detect stroking but are unresponsive to hair deflection and skin indentation. Some types respond to multiple stimuli while others respond only to one. They are present in most if not all mammals, "everyone from mice to humans." C LTMRs are the smallest and most common.

Some types of LTMRs, such as A δ and A β subtypes, are covered in a fatty



white substance called myelin. Like the plastic coating around an electrical wire, myelin insulates neurons, allowing nerve impulses to travel through the cell quickly. Other types, such as C LTMRs, are not insulated by myelin, so nerve impulses travel much slower.

"We think, collectively, the different tuning properties of these neurons explains how an animal perceives a large variety of tactile stimuli," Ginty said. In other words, once different ensembles of LTMRs are activated, they send signals to the spinal cord and the brain.

Some LTMR subtypes wrap around the base of hair follicles. When a follicle moves, neurons send signals to a bundle of nerves in the dorsal horn, a structure that receives sensory information from the body. From there, the sensory information is sent to the brain.

Ginty is also studying whether or not LTMR dysfunction explains hypersensitivity to touch in mouse models of autism spectrum disorders and similar conditions such as Rett syndrome and fragile X syndrome. Many people with these conditions over-respond to touch.

"We thought we could provide some insight as to why this is the case and, perhaps, address the potential relationship between tactile hypersensitivity and some of the other behaviors [in these conditions]," Ginty said.

Recently, he located nerves in the spinal cord that underlie hypersensitivity to light puffs of air in mice. Currently, Ginty is conducting experiments to study whether or not inhibition of LTMRs indicates anxiety-like behavior in mice. Results of his research will be published soon. **R**

Mazet To Give Leiter Lecture

Dr. Jonna Mazet will give the 2016 Joseph Leiter NLM/Medical Library Association Lecture, Wednesday, May 4. It will take place at 1 p.m. in Lister Hill Center auditorium, Bldg. 38A. Her topic will be "Emerging Infectious Diseases in the 21st Century: A Prevention Paradigm for Surveillance, Information Sharing and Health Diplomacy."

Mazet is professor of epidemiology and disease ecology and executive director of the One Health Institute at the UC Davis School of Veterinary Medicine, where she focuses on global health problem-solving, especially for emerging infectious diseases and conservation challenges. Currently, she is global director of a \$175 million viral emergence early warning project, PREDICT, that has been developed with the U.S. Agency for International Development Emerging Pandemic Threats Program. She was elected to the National Academy of Medicine in 2013.

The lecture will be recorded and broadcast live on the web and later archived at <http://videocast.nih.gov>.



Dr. Jonna Mazet

PHOTO: GREGORY URQUIAGA, UC DAVIS

Grady Presents Renfield Lecture at Rockefeller University

National Institute of Nursing Research director Dr. Patricia Grady presented the Beatrice Renfield Lecture in Research Nursing recently at Rockefeller University.

The talk honors the late Beatrice Renfield, a philanthropist who, noted Dr. Barry Collier (physician-in-chief and vice president for medical affairs at Rockefeller University), believed that “excellence in nursing is an essential foundation for improving quality health care.”

The audience was made up of an interdisciplinary, multi-state group who share Renfield’s belief in the importance of nursing research, including established leaders in the field as well as early career

researchers and doctoral students.

In her lecture, “Advancing Science, Improving Lives,” Grady discussed NINR and its role in support of the larger NIH mission. Grady provided an overview of NINR’s research portfolio, which is primarily

clinical in nature and focuses on wellness and quality of life across the lifespan and spectrum of disease.

Noting that “a number of advances in the areas of genomics and other fields have allowed nurses to better understand the symptoms of chronic illness,” Grady described NINR’s symptom science research model. It guides research by identifying a complex symptom, characterizing it into a phenotype with biological and clinical data and applying cutting-edge methodologies to identify therapeutic interventions. A number of studies under way in NINR’s Division of Intramural Research are using this model, including research into the mechanisms of cancer-therapy-associated fatigue and biomarkers of traumatic brain injury.

In a Q&A session that followed, Grady discussed NINR’s research on social determinants of health, precision medicine and the need to properly manage pain.



Dr. Barry Collier, physician-in-chief and vice president for medical affairs at Rockefeller University, introduces NINR director Dr. Patricia Grady.

PHOTO: WILL RAGOZZINO

NIH Supply Center Improves Offerings, Lowers Surcharge

The NIH Supply Center has improved operations to make it easier for NIHers to get products and supplies. It also has a new slogan, “Cost, Convenience, Customer Service—We Are Right Next Door!”

The SC is a fee-for-service organization that provides lab, medical and office supplies. There is a surcharge, recently reduced from 22 to 20 percent, but there are no delivery charges. The SC plans to continue lowering the surcharge 2 percent a year until 2019, when it will be 14 percent.

When you make a bulk/large purchase from the NIH Supply Center or its Self Service Stores, you can store your items in the Distribution Center

located in Gaithersburg. This is the Buy Bulk and Store Program; your products will be delivered to your lab/office with just a call to customer service, at no cost.

Standing orders can be placed for items ordered on a constant basis, with a

predetermined delivery date. This eases the burden on lab managers and administrative officers who approve the ordering process.

Supply Center stock is also listed in the POTS system. For more information about this process, contact the SC’s customer service representatives at (301) 496-9156 or (301) 496-3395.

In the fall, the SC team will be bringing lab and office supplies even closer to you. Stop by Bldg. 37 then to see what products are being offered through the Intelligent Vending Machine.

The SC plans to host a Table Top Expo every month in several lobbies around campus. Vendors will offer sales and product demonstrations that will benefit NIH researchers.

For details about ongoing initiatives, call the customer service representatives or the SC outreach team at (301) 594-0646. **R**





Hinde hopes her findings could one day lead to “precision milk” for vulnerable infants—such as in neonatal intensive care units—who do not have access to their own mother’s milk.

PHOTOS: ERNIE BRANSON

Hinde

CONTINUED FROM PAGE 1

finding subsequently replicated in cows. The milk produced for daughters contained more calcium. The milk produced for sons is richer in fat and protein.

“This doesn’t mean that one milk is biased or better,” she said. Rather, the “skeletal development of primate females is faster than the skeletal development of males. These sex-differentiated developmental trajectories are seen in rhesus monkeys, chimpanzees and humans.” In other words,

The presence of cortisol was best predicted by how many times the mother gave birth. The fewer offspring a mother had, the higher the concentration of cortisol. After each infant, the ability of the mammary gland to produce more milk improves.

“Young mothers—and not just because of their size—are handicapped by their mammary glands’ ability to synthesize milk.” Hinde said they are “producing less milk for their young—fewer calories due to lower volume.”

Within the last year, she noted, there have been several studies of human

Mother’s milk feeds not only the infant, but also its microbiome.

daughters need more minerals, sooner, because they grow faster.

Milk can also influence a baby’s temperament. Hinde’s research indicates that mothers who produced milk with higher levels of cortisol had babies that gained weight faster, were more nervous and less confident. A daughter’s temperament was also correlated with the mother’s social rank, Hinde added.

“This makes us suspect that milk cortisol is programming a ‘cheaper infant’ that is more nervous and less confident. And this may be leading to behavioral inhibition and lower activity budgets,” she said.

breast milk. These have identified what she described as exceptional features in human milk.

One study, led by researchers from the University of California, Davis, identified more than 1,500 proteins in human milk. Hinde said these proteins help digestion, foster immune development and aid in processing macro nutrients. Some of the proteins may also be involved in neurodevelopment of infants.

Another study found breast milk may protect infants from HIV. Each year, 240,000 children are infected with HIV. Half will contract it through breastfeeding. However,

85 percent of nursing mothers don’t pass the virus along to their children. Researchers showed infection rates are lower in human milk compared to cow and rhesus milk. Hinde said it’s unclear why. Further research is ongoing.

Mother’s milk feeds not only the infant, but also its microbiome. There are hundreds of different oligosaccharides—complex sugars—found in mother’s milk. They are the third most common component in breast milk after lactose and fat. Hinde said the sugars promote the growth of beneficial bacteria in the digestive tract and inhibit the colonization of harmful bacteria.

Hinde hopes these findings could one day lead to “precision milk” for vulnerable infants—such as in neonatal intensive care units—who do not have access to their own mother’s milk. Improved targeting of personalized milk has the potential to provide added value compared to the standardized formula and donor milk options currently available. **R**

Aug. 15-19

Apply Soon for Health Disparities Research Institute

The National Institute on Minority Health and Health Disparities will host the Health Disparities Research Institute Aug. 15-19.

The program provides a unique opportunity for early career researchers who are interested in health disparities and minority health research to learn more about the latest science and receive guidance on their own research project from leaders in the field.

Approximately 60 promising early career researchers, including senior postdoctoral scholars, research associates and assistant professors, will be accepted into the competitive program. Preference will be given to those who demonstrate a high potential to benefit from the program and incorporate the training into their own research.

The free program will feature seminars, small group discussions and consultations with NIH staff involved in minority health and health disparities-related research. Participants will receive advice on research strategies and methods specific to their project and how to develop their project into an R01, R21 or K award application.

The online application will open soon on the NIMHD web site, <http://bit.ly/hdinstitute16>, and will close at 5 p.m. on June 1. For more information, contact the course planning committee at NIMHDHealthDC@mail.nih.gov.



The world's older population continues to grow at an unprecedented rate.



World's Older Population Grows Dramatically, NIH-Funded Report Shows

The world's older population continues to grow at an unprecedented rate. Today, 8.5 percent of people worldwide (617 million) are age 65 and over. According to a new report, "An Aging World: 2015," this percentage is projected to jump to nearly 17 percent of the world's population by 2050 (1.6 billion).

"An Aging World: 2015" was commissioned by NIA and produced by the U.S. Census Bureau. The report examines the demographic, health and socioeconomic trends accompanying the growth of the aging population.

"Older people are a rapidly growing proportion of the world's population," said NIA director Dr. Richard Hodes. "People are living longer, but that does not necessarily mean that they are living healthier. The increase in our aging population presents many opportunities and also several public health challenges that we need to prepare for. NIA has partnered with Census to provide the best possible data so that we can better understand the course and implications of population aging."

Antiarrhythmic Drugs Found Beneficial When Used by EMS for Cardiac Arrest

Researchers have confirmed that certain heart rhythm medications, when given by paramedics to patients with out-of-hospital cardiac arrest who had failed electric shock treatment, improved likelihood of patients surviving transport to the hospital. The study was published online in the *New England Journal of Medicine* and helps answer a longstanding scientific question about the effectiveness of two widely used antiarrhythmic drugs, amiodarone and lidocaine, for treating sudden cardiac arrest.

The study followed the patients from hospital admission to hospital discharge. Although neither

drug significantly improved the overall rate of survival to hospital discharge, amiodarone showed a favorable trend in that direction. Survival to discharge is the point at which a patient is discharged from the hospital.

"This trial shows that amiodarone and lidocaine offer hope for bringing patients back to life and into the hospital after cardiac arrest," said principal study author Dr. Peter Kudenchuk of the University of Washington Medical Center in Seattle. "While the overall increase in survival to hospital discharge of about 3 percent with amiodarone was not statistically significant, it came very close. Importantly, there was a significant improvement in survival to hospital discharge with either drug when the cardiac arrest was bystander-witnessed."

Sudden cardiac arrest is a condition in which the heart suddenly or unexpectedly stops beating, cutting off blood flow to the brain and other vital organs. A bystander-witnessed cardiac arrest is one that is witnessed by another person.



Researchers have found the cellular switch that boosts activity of sperm cells so they can travel to the egg.

IMAGE: CARIN CAIN

Researchers Identify Molecule Needed for Sperm Activation

Researchers funded by NIH have discovered the cellular switch that boosts the activity of sperm cells so that they can travel to the egg.

The finding may lead to new options for male contraception as well as treatments for infertility resulting from problems with sperm mobility.

Inside the male reproductive tract, mature sperm are capable of limited movement. This limited movement, however, is not enough to propel them toward the egg when they enter the female reproductive tract. To begin their journey, they must first be activated by the hormone progesterone, which is released by the egg.

Publishing online in *Science*, the researchers report that the molecule to which progesterone must bind is the enzyme alpha/beta hydrolase domain containing protein 2 (ABHD2), found in the sperm cell's outer membrane. The study was conducted by Dr. Melissa R. Miller and colleagues at the University of California, Berkeley; the University of California, San Francisco; and Yale University School of Medicine.

"This is an important advance in explaining how sperm become hypermotile in the female reproductive tract," said Dr. Stuart Moss, director of the male reproductive health program at NICHD, which funded the study. "Developing new compounds that block ABHD2 ultimately may yield new contraceptive methods to prevent sperm from reaching the egg."

3-D Technology Enriches Human Nerve Cells for Transplant to Brain

NIH-funded scientists have developed a 3-D micro-scaffold technology that promotes reprogramming of stem cells into neurons and supports growth of neuronal connections capable of transmitting electrical signals. The injection of these networks of functioning human neural cells—compared to injecting individual cells—dramatically improved their survival following transplantation into mouse brains. This is a promising new platform that could make transplantation of neurons a viable treatment for a broad range of human neurodegenerative disorders.

Previously, transplantation of neurons to treat neurodegenerative disorders, such as Parkinson's disease, had very limited success due to poor survival of neurons that were injected as a solution of individual cells. The new research is supported by NIBIB.

"Working together, the stem cell biologists and the biomaterials experts developed a system capable of shuttling neural cells through the demanding journey of transplantation and engraftment into host brain tissue," said Dr. Rosemarie Hunziker, director of the NIBIB Program in Tissue Engineering and Regenerative Medicine. The results were reported in the Mar. 17 issue of *Nature Communications*.

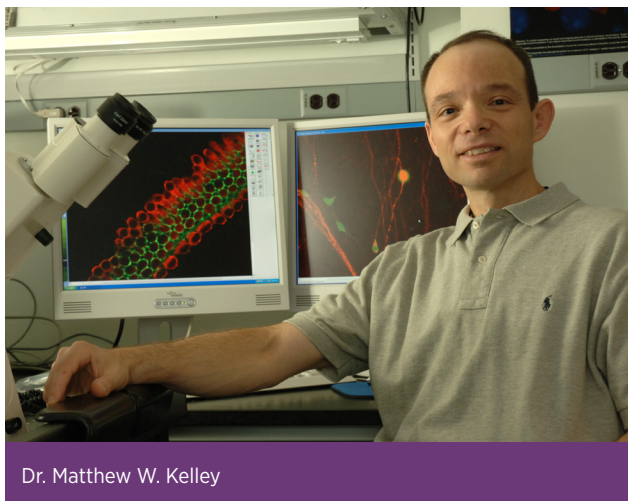
NIDCD's Kelley Named President of ARO

Dr. Matthew W. Kelley, chief of the Laboratory of Cochlear Development, National Institute on Deafness and Other Communication Disorders, has been named president of the Association for Research in Otolaryngology, the professional organization that encourages and promotes research in the field and stimulates scientific interest among its members. Kelley took office Mar. 1 after serving 1 year as president-elect. As president, he serves as the organization's chief officer and chairs the ARO Council.

Kelley and his colleagues investigate the development of the cochlea, the snail-shaped structure in the inner ear that contains the organ of hearing. The overall goal of his lab is to understand the molecular and cellular factors of different structures in the cochlea that are essential for sound to travel from the inner ear to the brain.

Kelley has been an active member of ARO for the past several decades and has served on numerous ARO committees. He is looking forward to his new role and is honored to have the opportunity to build on the services and benefits ARO provides to its members.

Kelley received his B.A. from Cornell University and his Ph.D. from the University of Virginia. Following a postdoctoral



Dr. Matthew W. Kelley

fellowship at the University of Washington, he became an assistant professor in the department of cell biology at Georgetown University in 1996. In 2000, he joined NIDCD, first as acting chief and then (since 2004) as chief of the laboratory's section on developmental neuroscience.

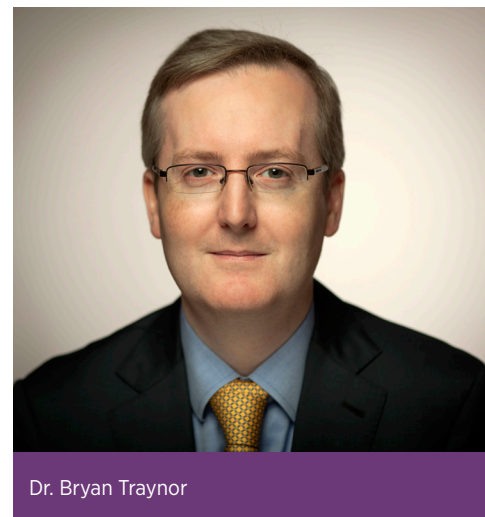
OD Welcomes Next ACEP Class

The NIH Office of the Director recently welcomed the second class of the Administrative Career Enhancement Program. ACEP is an initiative of the OD Voice, a committee with representatives from each OD office dedicated to analyzing the results of OD's segment of the Employee Viewpoint Survey.

The OD Voice explores how OD can improve its performance regarding concerns identified in the survey. The committee also

capitalizes on areas rated highly satisfactory and creates avenues to share this information and other best practices more broadly across OD.

ACEP was created to address the needs of junior-level OD staff. The program provides training and developmental opportunities, increases organizational knowledge, increases OD identity, enhances participants' professional networks and provides mentoring opportunities. The program is offered at no cost to OD federal staff; participants are nominated by their supervisors.



Dr. Bryan Traynor

NIA's Traynor Wins 2016 Potamkin Prize

Dr. Bryan Traynor of NIA's Laboratory of Neurogenetics and Dr. Rosa Rademakers of the Mayo Clinic have been awarded the 2016 Potamkin Prize for their contributions to research in Pick's, Alzheimer's and related neuromuscular diseases.

Presented by the American Academy of Neurology on Apr. 18 in Vancouver, the award specifically recognizes their discovery of the genetic mutation in the C9ORF72 gene responsible for a large number of cases of frontotemporal dementia and amyotrophic lateral sclerosis (ALS, also known as Lou Gehrig's disease). This finding provides an important mechanistic link between the two diseases.

The mutation in the C9ORF72 gene is a repeat expansion—small blocks of DNA are repeated over and over again, hundreds or even thousands of times.

"The repetitive nature of this mutation makes it particularly amenable to



ACEP class members include (from l) Alisha Washington, Stephanie Jackson, Woleola Akinso, Caviaunce Phillips, Cynthia White, Anne Smogur-Saldivar, Lynne Williams, Stephanie Bonhomme, Edison Morales, Ileana Turner, Terrance Shackelford, Zina Abdelaziz. Not shown are Tanya Barnett, Avraham Gross, Lakeisha Washington, Toddchelle Young.

therapeutic interventions using gene therapy and has many in the field wondering if these two diseases can be treated with the same, or similar, interventions,” Traynor said. “This work is already being pursued in laboratories around the world.”

Chief of the lab’s neuromuscular diseases research section since 2009, Traynor focuses his efforts on unraveling the genetic etiology of ALS and other neuromuscular disorders. His research team is also noted for conducting the first genome-wide association study of ALS, identifying the chromosome 9p association signal for ALS in the Finnish founder population and discovery of mutations in other genes that cause familial ALS and dementia.

Former Exec Officer Jarboe Mourned

George E. Jarboe, 85, who had a 26-year career at NIH, died Mar. 18 from complications of dementia.

A native Washingtonian, he attended St. John’s College High School, graduating in 1948. He spent 4 years (1950-1954) in the U.S. Air Force, stationed at Lowry Air Force Base in Colorado and Offutt Air Force Base in Omaha. After 3 years of undergraduate study, he received his B.A. degree from the University of Maryland in 1958.

After graduation, he was employed by the Department of the Navy. He came to NIH in 1959 as a management intern and, on completion of a 1-year training program, was employed by the Personnel Management Branch, Office of the Director, where



George E. Jarboe

he worked until he joined the staff of the Division of Research Grants in 1962.

Jarboe served as DRG administrative officer until January 1964, when he became a staff specialist in the DRG Career Development Review Branch. In the later 1960s, he held several posts in the office of the NIH assistant director for extramural research and training. In 1972, he became the first director of the Executive Secretariat at NIH. He subsequently became DRG’s executive officer, a position he held until his retirement in 1985.

Jarboe is survived by his daughter, Kathleen Jarboe Marsden, his grandchildren Ashley and Justin Van Steelant, his sister, Kathleen J. Hanlon and many nieces and nephews.

Inurnment will take place in Arlington National Cemetery at a later date. Memorial contributions may be made to the Children’s Inn at NIH, 7 West Dr., Bethesda, MD 20814. [R](#)

MAY 10

Ungerleider Gives Roberts Lecture

The next Anita B. Roberts Lecture will be given by Dr. Leslie Ungerleider, senior investigator in the Laboratory on Brain and Cognition and chief of the section on neurocircuitry at the National Institute on Mental Health. Her talk, “Functional Architecture of Face Processing in the Primate Brain,” will be held on Tuesday, May 10 at 1 p.m. in Wilson Hall, Bldg. 1. The Roberts series highlights outstanding research achievements of women scientists in the Intramural Research Program at NIH. The NIH women scientist advisors committee and ORWH sponsor the seminars.

Ungerleider’s research involves examining the neural mechanisms for the processing of facial identity and facial expression in the brains of human and nonhuman primates. She has more than 40 years of research experience in the field of cognitive neuroscience, with a focus on visual perception and attention. She is an NIH Distinguished Investigator and member of the National Academy of Sciences, the American Academy of Arts and Sciences and the National Academy of Medicine.

The series is dedicated to the memory of Roberts and honors her role as an exceptional mentor and scientist. She was chief of NCI’s Laboratory of Cell Regulation and Carcinogenesis from 1995 to 2006. Prior to her death in May 2006, she spent 30 years at NIH as a research leader. The lecture is open to all and will be followed by a question-and-answer session addressing career issues for women in science. Sign language interpreters will be provided on request.

Study Participants with Memory Problems Sought

Researchers at the National Institute on Aging seek participants with mild cognitive impairment or early stage Alzheimer’s disease. Researchers are investigating a drug called “exendin-4” (exenatide, trade name Byetta). The study will see if the injection of exendin-4 is safe and how it affects brain chemistry and memory in people with mild cognitive impairment or mild Alzheimer’s disease. There is no cost for study-related tests or medications. For more information, call the Office of Patient Recruitment, 1-866-444-2214 (TTY 1-866-411-1010). Refer to study 10-AG-0423.

Patients with Fatty Liver Needed

Researchers at NIDDK seek people with fatty liver disease to participate in a study. Scientists want to learn more about food metabolism in people with fatty liver disease. If you have been diagnosed with non-alcoholic fatty liver disease or steatohepatitis you may be interested in participating. Participants will stay 2 nights at the Clinical Center. Compensation is provided. For more information, call 1-866-444-2214 (TTY 1-866-411-1010) and refer to study 15-DK-0174.

Study Seeks Healthy Older Adults

Healthy older adults ages 55-75 are invited to participate in an outpatient research study investigating the benefits of omega-3 oil and blackcurrant supplements on vascular health. The goal of the study is to determine whether the supplements improve blood flow and blood vessel function that can affect your heart. Eligible participants must be medication-free and in good general health. The study will be carried out in an outpatient clinic and includes 4 visits over 6 months. Compensation is provided. For more information, call 1-800-411-1222 (TTY 1-866-411-1010) and refer to study 14-NR-0034.

Volunteers Needed for Energy Study

NIDDK seeks healthy Caucasian men, 55-75 years old, and women 18-35 to participate in a research study. Doctors want to learn how the body burns energy at different temperatures. You will have an 8-day inpatient stay at the Clinical Center. Compensation is provided. For more information, contact the Office of Patient Recruitment, 1-866-444-2214 (TTY 1-866-411-1010). Refer to study 12-DK-0097.

NHGRI Seeks Volunteers

NHGRI researchers seek people with chromosome abnormalities involving the sex chromosomes for a research study. Compensation is provided. For more information, call 1-866-444-2214 (TTY 1-866-411-1010) and refer to study 12-HG-0181.



Melissa DeAraujo Vieira was one of several young people to visit with circus clowns Mar. 30 at the Clinical Center. Later that day, more than 1,750 children and their families involved with NIH Charities and local non-profits experienced the circus in person at the Verizon Center in Washington, D.C., courtesy of patrons who bought their tickets through the Recreation & Welfare Association at NIH.

19TH YEAR IN A ROW

Circus Delights, Benefits NIH Community

PHOTOS: ERNIE BRANSON, MICHAEL SPENCER

Clowns with Ringling Bros. and Barnum & Bailey Circus visited several young patients at the Clinical Center during the day on Mar. 30. That evening, kids of all ages were treated to the

annual Children's Premiere Night put on by the circus at the Verizon Center in Washington, D.C.

"Thanks to those who purchased tickets to the show, NIH's Recreation & Welfare Association was able to treat more than 1,750 children and families from the NIH Charities and local non-profits to a night of fun," said David Browne of the NIH R&W Association.

It was the 19th year in a row that the R&W participated in the event, which benefits NIH Charities. Over the years, more than 28,000 local children have been treated to the food, fun and entertainment of the circus experience.

This year for the first time, NIH R&W worked with the employee association of LexisNexis Special Service Department and was able to include more than 130 at-risk youth invited by the Metropolitan Police Department, according to Randy Schools, longtime R&W CEO and coordinator of the event who now volunteers with the association. "R&W and LexisNexis treated not only NIH patients and those of Special Love, but were also able to treat youth from D.C.—most of whom had never been to the circus before," he said. "We are looking forward to 2017 for the 20th anniversary of the event."



Jackson Higgins mugs with the clowns during their recent NIH visit.



Howayne McGregor (l) is greeted by circus ringmaster David Shipman. Below, they meet up with Jefferson Hernandez Lopez and mom Sarita Lopez.



Rebekah (c) and Mary Haynes hobnob with the ringmaster.



Dhruv Jain (2nd from r) meets performers "under the big top" at the Verizon Center.